## REMARKS

Claims 1-9 are pending in the present application. The Specification has been amended to correct certain typographical errors. Support for the amendment made to the Specification is found at Page 5, line 4 of the Specification and in Figure 1 as originally filed. The Abstract has been amended to correct a simple typographical error. No new matter has been introduced by these amendments. Reconsideration and allowance of the claims is respectfully requested in view of the above amendments and the following remarks.

Objection to the Abstract

The Abstract is objected to because in the last line the word "form" should be replaced by the term "from". Applicants have accordingly amended the Abstract.

Claim Rejections Under 35 U.S.C. § 102(b)

Claims 1-5 and 7-9 stand rejected under 35 U.S.C. § 102(b), as allegedly anticipated by U.S. Patent No. 4,812,049 to McCall ("McCall"), or by U.S. Patent No. 5,456,533 to Streiff et al. ("Streiff"). Applicants respectfully traverse this rejection.

To anticipate a claim, a reference must disclose each and every element of the claim. *Lewmar Marine v. Varient Inc.*, 3 U.S.P.Q.2d 1766 (Fed. Cir. 1987). Claim 1 sets forth in part, "....an incorporated surface arranged in the main flow channel...the incorporated surface having leading edges that are orientated against the first flow and around which the first flow can move freely...wherein the incorporated surface has a chamber into which a separate flow channel for a second flow of gas leads; said chamber being provided on a rear side of the incorporated structure that faces away from an inflow of the first flow of gas with outlet openings into the first flow of gas." Therefore, in order to anticipate Claim1, both McCall and Streiff must disclose, at the very least, (1) leading edges around which the first flow can move freely, and (2) a chamber on the rear side of the incorporated structure.

McCall teaches a device for mixing and/or dispersing fluids (Abstract). McCall especially discloses mixing components which are incorporated into a mixing system wherein

various kinds of fluids pass through a conduit(s) and around and through the components and are subjected to turbulent mixing (Column 1, lines 10-17). Referring to Figure 1, McCall discloses a conduit or pipe 11 within which a fluid-dispersing element 12 is positioned coaxially (Column 2, lines 42-44). Dispersing element 12 is secured to a conduit 13, passing through, and preferably secured to, the wall of conduit 11, and is in the form of two frustums joined together at their wide ends (Column 2, lines 48-53). Element 12 is also provided with a passageway 14 therethrough, to permit the movement therethrough of a second fluid, coming from conduit 13, which is to be mixed with fluid flowing through conduit 11 (Column 2, lines 54-57). Dispersing element 12 is mounted substantially normal to the direction of fluid flow in conduit 11, and, being of a diameter which is smaller than the inner diameter of conduit 11, the fluid is caused to flow through the region defined by the periphery of element 12 and the inner surface of conduit 11 (Column 2, lines 60-66).

Therefore, McCall teaches the flow of a first fluid wherein the flow of the first fluid is defined by the periphery of element 12 and the inner surface of conduit 11. McCall, however, does not disclose leading edges orientated against the flow around which the flow can move freely.

Furthermore, though McCall teaches the formation of a passageway 14 through element 12 to allow for the movement of a second fluid to be released into conduit 11, McCall does not teach a chamber on the rear side of the incorporated structure. A passageway is separate and distinct from a chamber. As defined by Webster's Dictionary, a "passageway" is defined as "a way that permits passage, a corridor." "Chamber", however, is defined as "an enclosed space; cavity". Therefore, due to the distinct meanings between "passageway" as used by McCall, and "chamber" as used by Applicants in Claim 1, McCall does not teach or suggest Applicants' claimed "chamber on the rear side of the incorporated structure".

Streiff discloses a static mixing element in a flow channel that has at least two deflectors disposed on mountings at a distance from the channel wall (Abstract). The deflectors are arranged to form an angle to the main flow direction (Abstract). Referring to Figure 1, Streiff teaches a mixing element 4 comprising two deflectors 30 which are secured

by way of a mounting 20 in a flow channel 7 (Column 2, lines 64-66). The deflectors 30 produce corresponding turbulent flow cones 26, 27 which are deflected in the directions 16, 17 and which cross one another in staggered relationship (Column 3, lines 3-6). Referring to Figures 8a and 8b, Streiff teaches a mixing device having two dispensing tubes 21 on a main tube 20 as mountings, one deflector 30 each disposed at the dispensing tube outlet orifices 28 (Column 3, line 65 – Column 4, line 1). The deflectors 30 produce deflected turbulent cones 26, 27 of the main fluid 2, such cones crossing the injected cones 8 of the admixed fluid 1 and thus being subject to intensive mixing (Column 4, lines 6-9). The two deflectors 30 and the dispensing tubes 21 are orientated in opposite directions relatively to Z and are staggered relatively to one another along the main tube 20 (Column 4, lines 9-11). Crossing subflows 16, 17 are therefore produced, leading to intensive mixing and homogenization of the two fluids 1, 2 over the main channel cross-section (Column 4, lines 12-14).

Therefore, unlike Applicants' Claim 1, Streiff does not teach a leading edge around which the first flow can move freely. Rather, the mounting taught in Streiff is not an edge, but rather, a pipe extending into the flow. Such a structure would cause a different degree of flow change compared to that caused by the claimed leading edge. Furthermore, Streiff does not teach a chamber on the rear side of the incorporated structure. Rather, Streiff discloses a dispensing tube through which the fluid moves from the main tube to the deflectors. This dispensing tube is distinguished from the chamber claimed by Applicants, wherein the chamber is a cavity in the incorporated surface.

As neither McCall nor Streiff teach or suggest all elements of Claim 1, i.e., at least (1) leading edges around which the first flow can move freely, and (2) a chamber on the rear side of the incorporated structure, neither of the references anticipates Claim 1. As dependent claims cannot be anticipated by a reference that does not anticipate the independent claim, Claims 2-5 and 7-9 are not anticipated by McCall or Streiff. Therefore, Applicants respectfully request reconsideration and withdrawal of the rejection of Claims 1-5 and 7-9.

Claims 1-5, 8, and 9 stand rejected under 35 U.S.C. § 102(b), as allegedly anticipated by U.S. Patent No. 3,885,918 to Isahaya ("Isahaya"). Applicants respectfully traverse this

rejection.

To anticipate a claim, a reference must disclose each and every element of the claim. *Lewmar Marine*, 3 U.S.P.Q.2d at 1766. Claim 1 sets out in part: "...an incorporated surface arranged in the main flow channel which affects the first flow, the incorporated surface having leading edges that are orientated against the first flow and around which the first flow can move freely, the leading edge having components that act in a main direction of flow of the gas as well as transversely thereto; wherein the incorporated surface has a chamber into which a separate flow channel for a second flow of gas leads; said chamber being provided on a rear side of the incorporated structure that faces away from an inflow of the first flow of gas with outlet openings into the first flow of gas." Therefore, in order to anticipate Claim 1, Isahaya must, at the very least, disclose (1) leading edges orientated against the first flow; (2) leading edges having components that act in a main direction and transversely to the flow of gas; and (3) a chamber on a rear side of the incorporated structure facing away from an inflow of the first flow of gas with outlet openings into the first flow of gas.

Isahaya teaches an exhaust gas cleaning apparatus comprising a tower of substantial volume functioning as a main flow channel (Abstract). Referring to Figure 1, Isahaya discloses a two-fluid type nozzle 20 disposed at the substantially center portion of the top of a reaction tower 101 (Column 2, lines 47-49). The nozzle 20 is supplied with spray liquid 31 and compressed gas 32 which are sprayed into the reaction tower as a spray mist (Column 2, lines 53-55). Referring to Figure 2, Isahaya discloses an example of the bell-jar type two-fluid radial spray nozzle. Isahaya teaches that in operation of the spray nozzle, the alkali solution 31 is introduced through an inlet port 13 of the inner casing and compressed gas is introduced through the air nozzle 21 tangentially into the air chamber 22 (Column 3, lines 38-43). The compressed gas serves to draw the alkali solution in the liquid chamber 14 through the outlet port 16 into the spray grooves 24 and spray therefrom through the spray ports 25 in the form of a fine mist 33 into the flow of the exhaust gas (Column 3, lines 43-47).

Therefore, Isahaya teaches a nozzle disposed in a reaction tower, wherein the nozzle comprises a chamber into which a gas flows. The gas then moves from the chamber and into spray grooves wherein it combines with the spray liquid to form a mist which is then

distributed into the reaction tower by means of spray ports.

Though the chamber taught in Isahaya does hold a gas, it does not contain outlet openings into the first flow of gas as is set forth in Claim 1. Rather, the chamber disclosed in Isahaya leads to a separate spray groove entity, wherein spray ports, which introduce the mist to the exhaust gas, are positioned at the end of the spray groove. Therefore, Isahaya does not teach or suggest a chamber with outlet openings into the first flow of gas.

Nor does Isahaya teach a chamber on a rear side of the incorporated structure. Rather, based on Figure 2, air chamber 22 appears to be located on the inner center portion of the incorporated structure. Therefore, Isahaya does not teach or suggest a chamber on a rear side of the incorporated structure.

Applicants further submit that the nozzle taught in Isahaya does not have leading edges orientated against the first flow, or leading edges having components that act in a main direction and transversely to the flow of gas. The spray nozzle disclosed in Isahaya comprises a frustum wherein the widest side of the frustum faces away from the direction of flow. The corners of the frustum taught in Isahaya cannot be seen as a leading edge around which the flow can move freely. Furthermore these corners are not orientated against the flow.

Therefore, Applicants respectfully submit that as Isahaya does not, at the very least, teach or suggest at least (1) leading edges orientated against the first flow; (2) leading edges having components that act in a main direction and transversely to the flow of gas; or (3) a chamber on a rear side of the incorporated structure facing away from an inflow of the first flow of gas with outlet openings into the first flow of gas, Isahaya does not anticipate Claim 1. As dependent claims cannot be anticipated by a reference that does not anticipate the independent claim, Claims 2-5, 8, and 9 are not anticipated by Isahaya. Therefore, Applicants respectfully request reconsideration and withdrawal of the rejection of Claims 1-5, 8, and 9.

Claim Rejections Under 35 U.S.C. § 103(a)

Claim 6 stands rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over any one of Isahaya, McCall, and Streiff, taken in view of USSR 1599067A1 ("'067"). According to the Examiner, Isahaya (Figures 1 and 2), McCall (Figures 1 and 4; Column 3, lines 13-18, Column 3, line 48 – Column 4, line 2), and Streiff (Figures 2, 11d, and 12; Column 2, lines 27-29; Column 3, lines 1-6, and 17-25; Column 4, lines 34-36) each alone substantially teaches Applicants' invention as recited by Claim 6, except for the angle that the incorporated surface forms with the main gas flow direction being adjustable. The Examiner states that '067 (English Abstract; Figure) discloses an apparatus similar to that of each of the alternative primary references, wherein the angle of the incorporated surface (5), which delivers a secondary fluid into the main gas flow through the apparatus, is adjustable as dictated by the properties of the main gas flow stream. The Examiner states that it would have been obvious for an artisan, at the time of the invention, to modify the structures of the incorporated surfaces of any one of the alternative primary references, to be of adjustable orientation within the main gas flow, in view of the Soviet reference, since such would allow for any one of the alternative primary reference apparatuses to be readily adaptable to main gas streams of varying flow velocity and/or viscosity, among other variable stream parameters. Applicants respectfully traverse this rejection.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a prima facie case of obviousness. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Establishing a prima facie case of obviousness requires that all elements of the invention be disclosed in the prior art. *In re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A 1970). Claim 6 depends from Claim 1. Therefore, in order to establish a prima facie case of obviousness for Claim 6, all elements of independent Claim 1 must be taught or suggested by the prior art references either alone or in combination.

As previously stated, Claim 1 sets out in part: "...an incorporated surface arranged in the main flow channel which affects the first flow, the incorporated surface having leading edges that are orientated against the first flow and around which the first flow can move freely, the leading edge having components that act in a main direction of flow of the gas as

well as transversely thereto; wherein the incorporated surface has a chamber into which a separate flow channel for a second flow of gas leads; said chamber being provided on a rear side of the incorporated structure that faces away from an inflow of the first flow of gas with outlet openings into the first flow of gas." Therefore, in order to establish a prima facie case of obviousness against Claim 1, Isahaya, McCall, Streiff, and '067, either alone or in combination, must at the very least, teach or suggest (1) leading edges orientated against the first flow; (2) leading edges having components that act in a main direction and transversely to the flow of gas; and (3) a chamber on a rear side of the incorporated structure facing away from an inflow of the first flow of gas with outlet openings into the first flow of gas.

As previously stated, neither Isahaya, McCall, or Streiff, teach or suggest all elements of Claim 1, i.e., at least (1) leading edges around which the first flow can move freely, and (2) a chamber on the rear side of the incorporated structure. Applicants further submit that '067 does not cure this deficiency.

Rather, '067 teaches a cleaner comprising a horizontal casing (1) with phase pipes (2,3) and in sections (4) filled with packing (5) and having intermediate gas distributors (9) which are sloped sheets (English Abstract). The sheets rotate the gas stream before each successive section which, in turn, rotate perpendicular to the gas stream flow direction (English Abstract). Therefore, '067 does not teach leading edges, or a chamber on a rear side of an incorporated structure as claimed by Applicants.

Applicants accordingly submit that not all elements of Claim 1 are taught or suggested by Isahaya, McCall, Streiff, or '067, either alone or in combination. Because dependent Claim 6 includes all of the limitations of independent Claim 1, Applicants respectfully submit that not all elements of Claim 6 are taught or suggested by these references. Therefore, a prima facie case of obviousness has not been established for Claim 6. Therefore, Applicants respectfully request reconsideration and withdrawal of the rejection of Claim 6.

In light of the foregoing amendments and remarks, reconsideration by the Examiner is respectfully requested. It is believed that the foregoing amendments and remarks fully

comply with the Office Action and that the claims herein should now be allowable to Applicants.

A "Marked-up" version of the amendments made herein are attached with this communication.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicants' attorneys.

Respectfully submitted,

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## VERSION WITH MARKINGS TO SHOW CHANGES MADE

A marked-up version of the 1st full paragraph on page 5 follows:

The media are mixed by at least one incorporated surface 7 that is arranged in the main flow channel 1. This incorporated surface 7 is a so-called incorporated vortex surface that is used to generate leading-edge vortices. The leading edge 8 of the incorporated surface 7 that is configured, for example, as a circular disc, which is oriented against the flow in the main flow channel 1 and about which the flow can move freely, has components that act both in the direction of the main flow 9 and transversely to this. Since, in addition, each incorporated surface 7 is arranged at an acute angle $\alpha$ to the main direction of flow 9 in the flow channel 1, vortex fields are formed on each leading edge of the incorporated surface, and these widen out conically as they move downstream. When this happens, the individual vortices roll inward on the rear side 10 of the incorporated surface 7. The vortices that are formed on each individual leading edge 84 are largely stationery and thus do not change position. Because of its rotation, each vortex field forms a component of the flow that is transverse to the main direction 9 in which the gas is flowing, and this results in good mixing of the gas mixture because of the associated pulse exchange across the direction of flow.

A "marked-up" version of the Abstract follows:

ABSTRACT

A mixer for mixing at least two flows of gas or other Newtonian liquids is provided herein. The mixer includes a main flow channel through which a first flow of gas passes, with an incorporated surface that is arranged therein and which affects the flow. This incorporated surface has leading edges that are orientated against the flow and about which the flow can move freely; the leading edges include a component that acts in the direction of the main flow of the gas flow as well as a component that acts transversely thereto. In order to ensure that an additional gas or liquid component is mixed in rapidly, provision is made such that the incorporated structure surface has a chamber into which a separate flow channel for a second gas flow leads and the chamber has outlet openings into the first gas flow on a rear side of the incorporated surface that faces away ~~fo~~rom the first gas flow.